

ROCKY CREEK, POST-WILDFIRE DEBRIS FLOODING ALONG PALO COLORADO ROAD BIG SUR ,CA

**CA DEPARTMENT OF
WATER RESOURCES,
WATERSHED
UNIVERSITY**

OCTOBER 16, 2018



THE SPEAKER



**Alex Yescas, PE, CFM, ENV SP
HDR**

Water Resources Sector Lead

- **Vice Chair, Floodplain Management Association**
- **Monterey County Fire**
- **Orange County Fires**
- **San Diego County Fires**
- **Ventura County Fires**

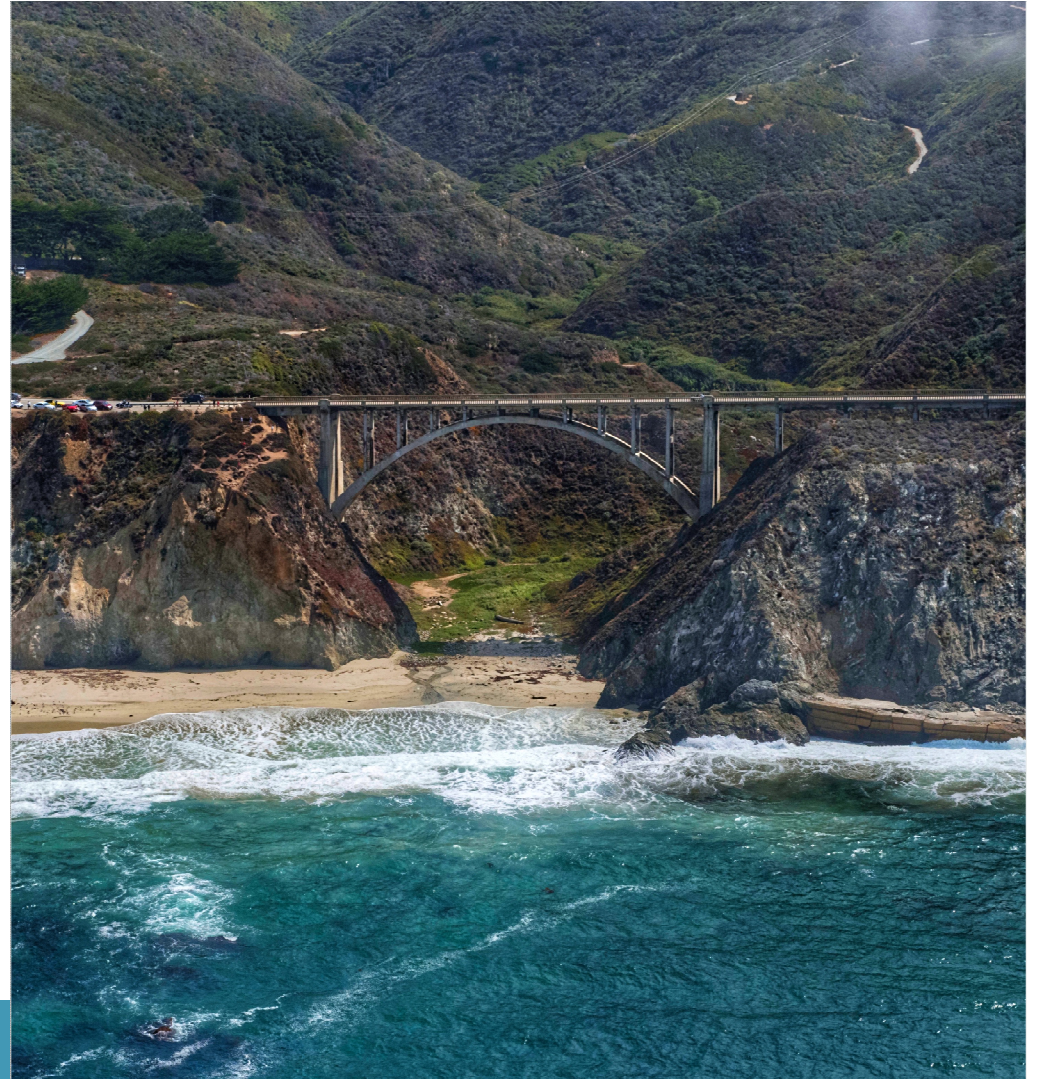
AGENDA

- The Setting - Fire & Rain
- The Repair – Designing a Solution
- The FEMA Factor
- Lessons Learned
- Questions/Discussion



THE SETTING

Fire + Rain



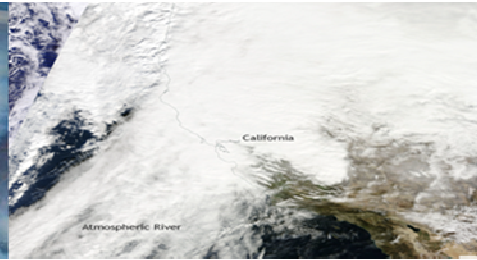
BACKGROUND + TIMELINE OF EVENTS



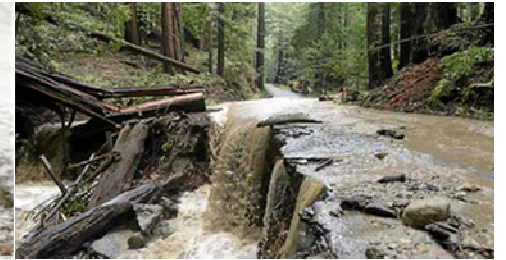
Remote Location



2016 Soberanes Fire



2016-2017 Winter Storms



Damage



PALO COLORADO CANYON

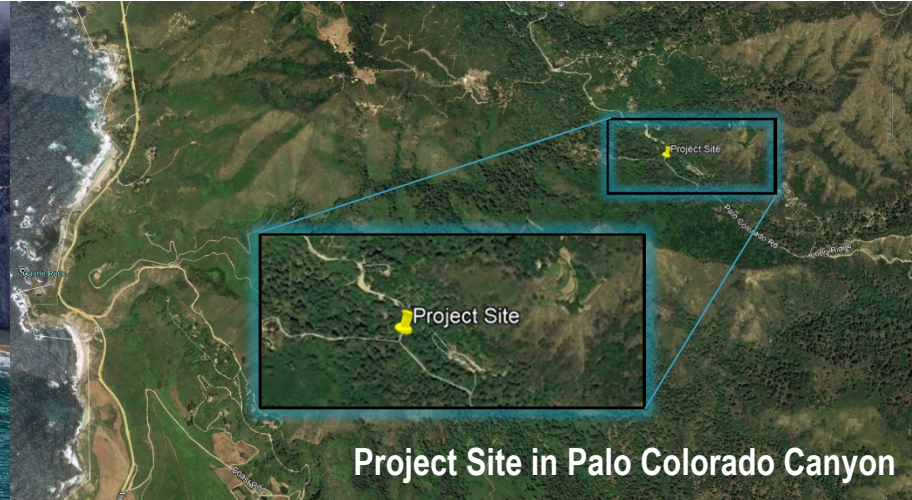
Remote location

- Big Sur, Monterey County
- Rocky Creek flows down canyon
- Project site 3 miles inland from Highway 1





Rocky Creek flows into Pacific Ocean



Project Site in Palo Colorado Canyon



PALO COLORADO CANYON

Remote location

PALO COLORADO CANYON

Established Community



2016 SOBERANES FIRE





2016 SOBERANES FIRE

2016 SOBERANES FIRE



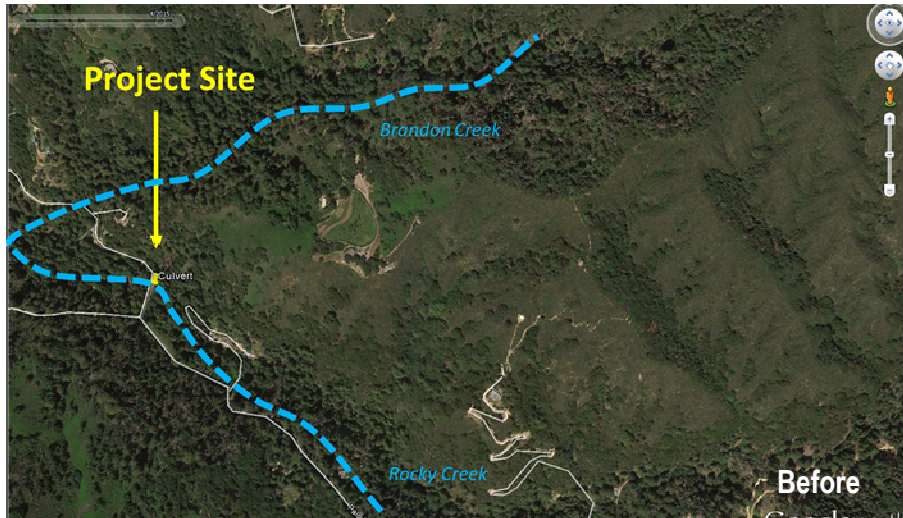


2016 SOBERANES FIRE

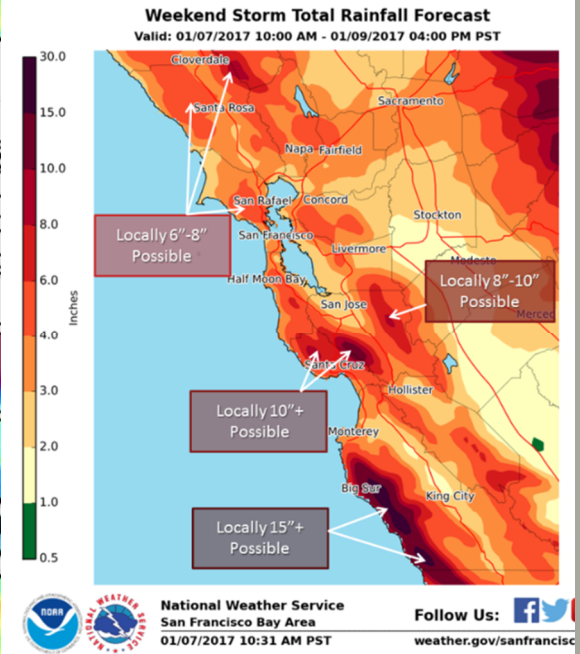
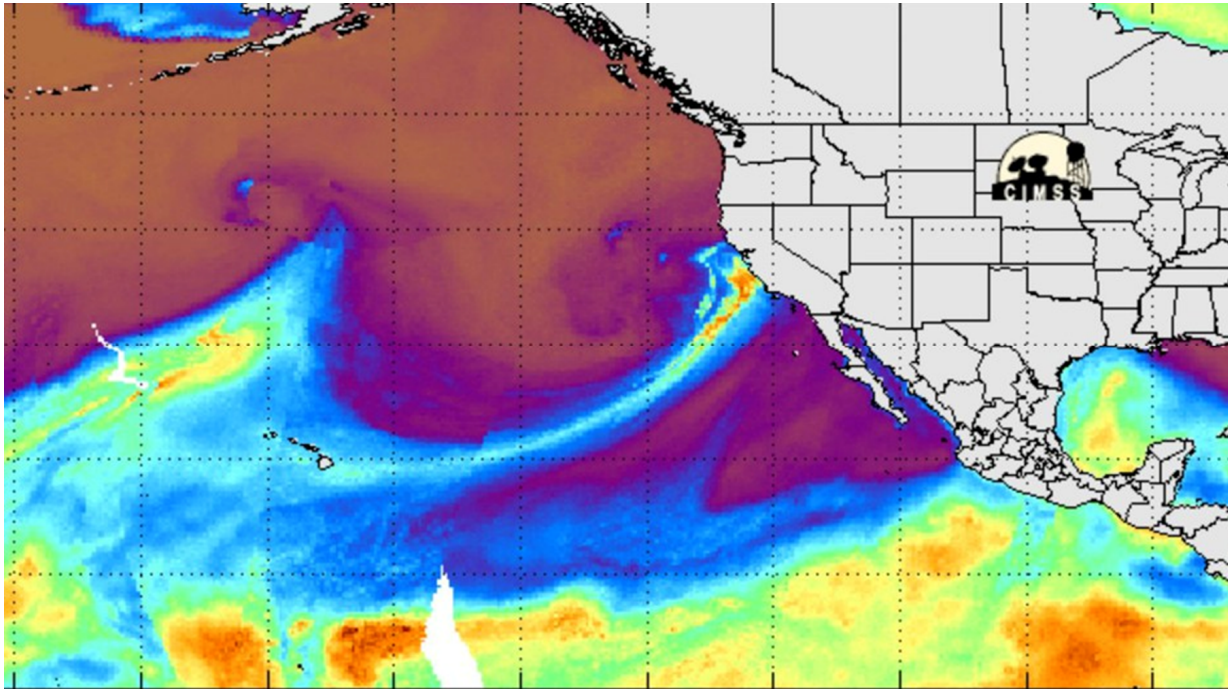


2016 SOBERANES FIRE





2016 SOBERANES FIRE



2016-2017 WINTER STORMS / ATMOSPHERIC RIVERS

2016-2017 WINTER STORMS



CREEK SCOUR AND MIGRATION



ROAD FAILURES



DEBRIS DAMS

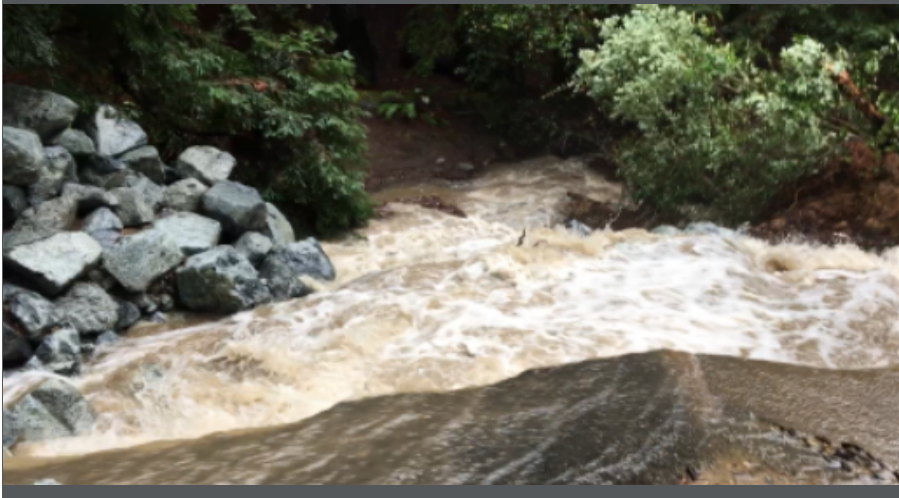


THE REPAIR

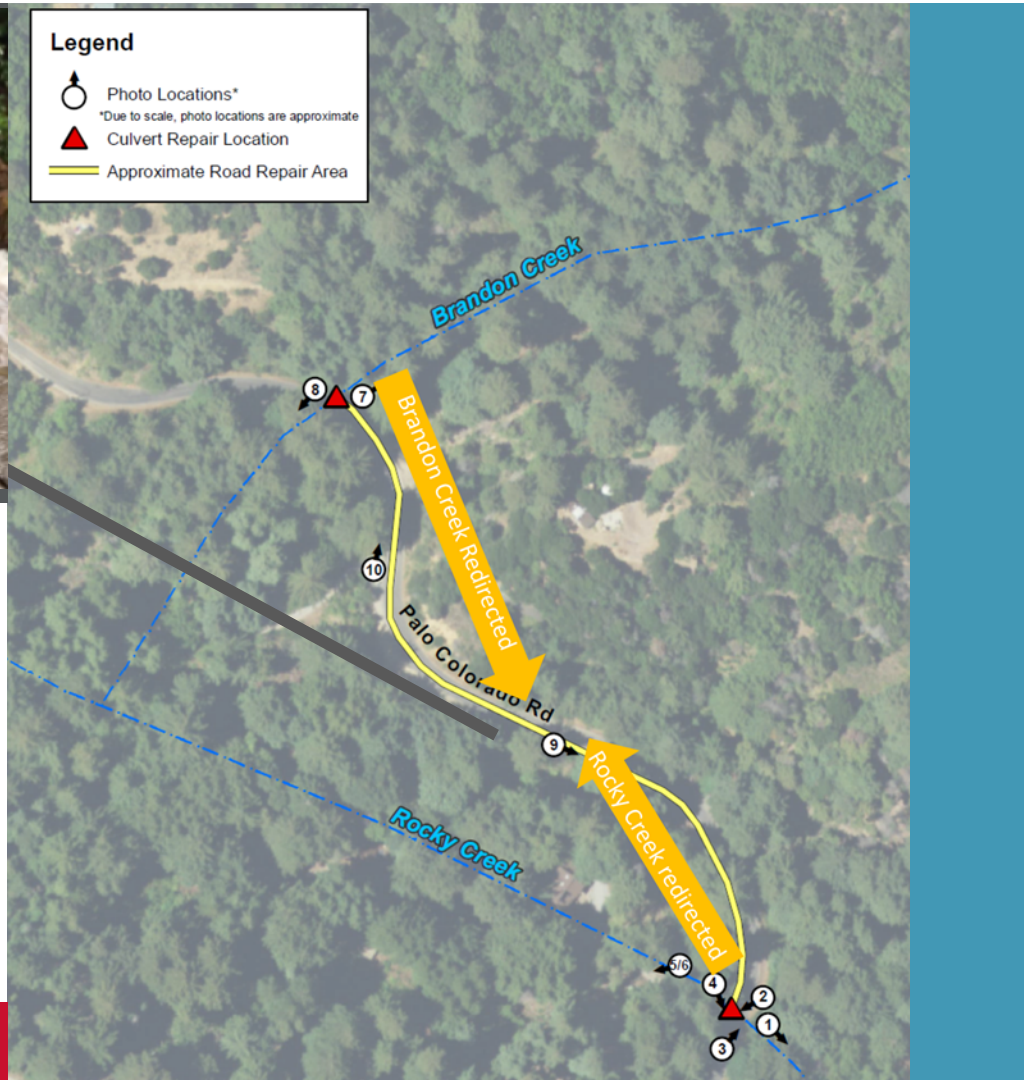
Designing a Solution







THE DAMAGE



THE DAMAGE

Rocky Creek Culvert (upstream side)



THE DAMAGE





THE DAMAGE

Palo Colorado Road



ACCESS LIMITATIONS FOR RESIDENTS AND SAFETY VEHICLES



BAER AND WERT REPORTS

Burned Area Emergency Response
Sobranes Fire
Los Padres National Forest
Hydrology and Watershed Specialist Report
September 6, 2016



Ocean view from the Joshua Creek watershed

Submitted by:
Luke Rutten, Tahoe National Forest
Kelsha L. Anderson, Angeles National Forest

Soberanes Fire Watershed Emergency Response Team Report



CA-BEU-003422

September 29, 2016

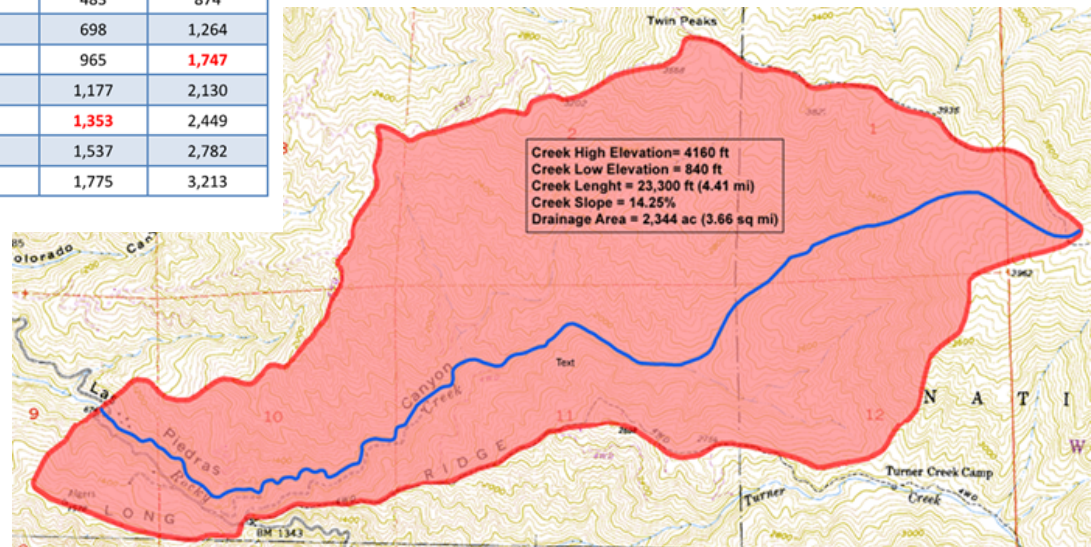


COUNTY OF MONTEREY HYDROLOGY – REFERENCED USGS REGRESSION

Table 1 -USGS Regression Equations - Rocky Creek Hydrology at Palo Colorado Road Crossing

Storm Event	USGS Hydrologic Regression Equations Central Coast	Drainage Area (sq-mi)	Annual Precipitation (in)	Discharge, Q (cfs)	Bulked* Discharge Q*1.81 (cfs)
2-year	$0.00459 * (\text{DRNAREA})^{0.856} * (\text{PRECIP})^{2.58}$	3.59	43	225	406
5-year	$0.0984 * (\text{DRNAREA})^{0.852} * (\text{PRECIP})^{1.97}$	3.59	43	483	874
10-year	$0.460 * (\text{DRNAREA})^{0.846} * (\text{PRECIP})^{1.66}$	3.59	43	698	1,264
25-year	$2.13 * (\text{DRNAREA})^{0.842} * (\text{PRECIP})^{1.34}$	3.59	43	965	1,747
50-year	$5.32 * (\text{DRNAREA})^{0.840} * (\text{PRECIP})^{1.15}$	3.59	43	1,177	2,130
100-year	$11.0 * (\text{DRNAREA})^{0.840} * (\text{PRECIP})^{0.994}$	3.59	43	1,353	2,449
200-year	$20.3 * (\text{DRNAREA})^{0.840} * (\text{PRECIP})^{0.865}$	3.59	43	1,537	2,782
500-year	$39.0 * (\text{DRNAREA})^{0.842} * (\text{PRECIP})^{0.729}$	3.59	43	1,775	3,213

*Bulked factor of 1.81 is based on an evaluation by Cal OES WERT



DESIGN APPROACH

Meet with
Permitting
Agencies

Engage
Design Team

Present
Design
Alternatives

Submit 30%
Design &
Cost
Estimate

Develop 80%
Design

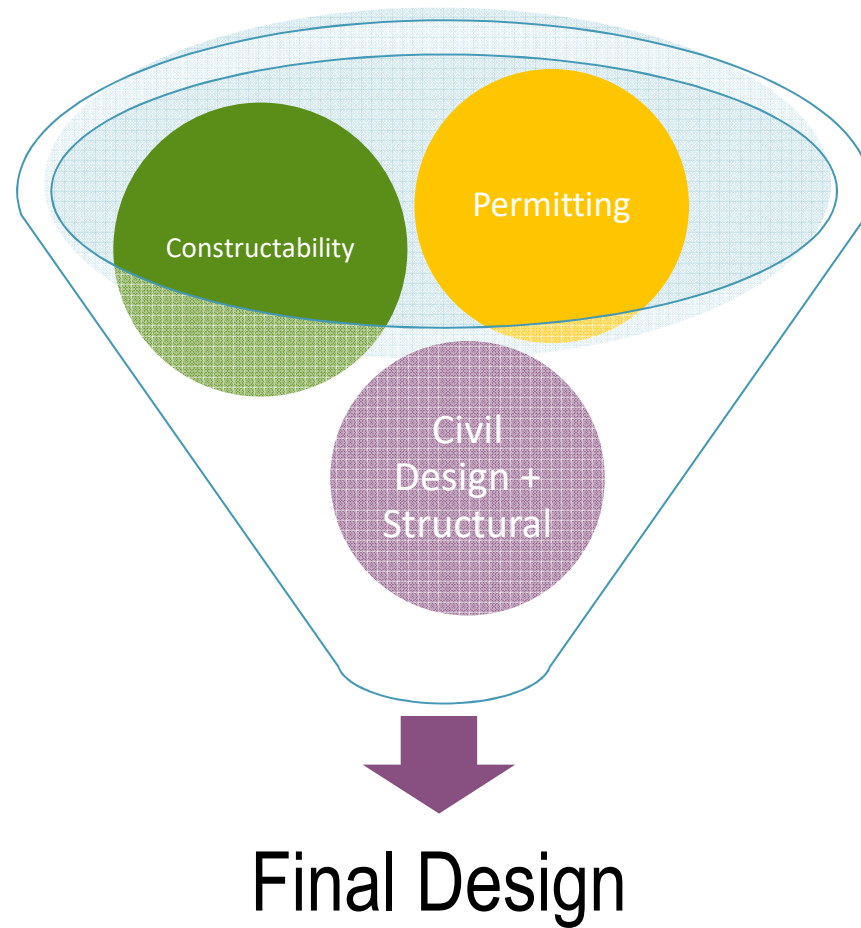
Develop
100% Design

Coordinate with Permitting Agencies

Coordinate with FEMA + Cal OES

INTEGRATED APPROACH

Producing Final Design Plans

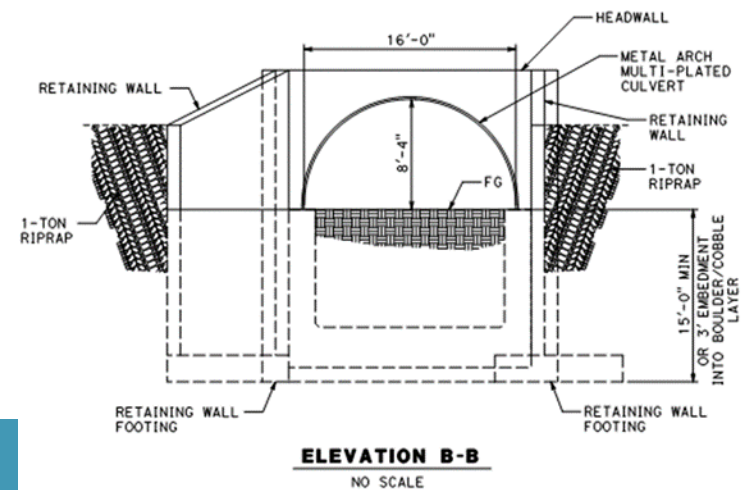


Final Design

PRIORITIZE ALTERNATIVES – 30% DESIGN

Location	Recommended Design Alternative	Cost Effective	Expedited Schedule	Emergency Access	Constructible	Permitable
Rocky Creek	Bridge on Slab (Recommended)		✓	✓	✓	✓
	10x13 Metal Arch Span	✓			✓	✓
	10x8 Concrete Box Culvert	✓			✓	✓
Brandon Creek	2-48" CMPs	✓	✓	✓	✓	✓
Palo Colorado Road	MSE Wall at Washout Area (Recommended)			✓	✓	✓
	Max Fill Slope			✓	✓	

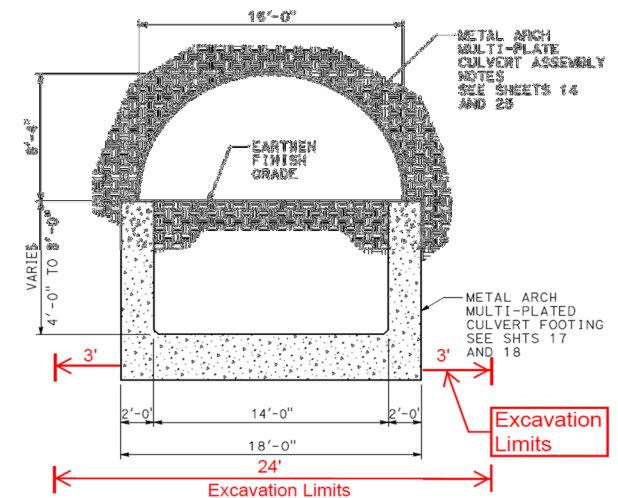
NEW CULVERT CROSSING CONSTRUCTED ON SITE



CONSTRUCTABILITY

Designing a Solution

Design	Footing Type	Excavation Amount (CY)	Excavation Depth (ft)	Excavation Width (ft)
80%	Spread Footing	10,000	32	34
100%	"U-Shaped" Footing	8,000	28-32	24





REMOVAL OF COASTAL REDWOODS

THE FEMA FACTOR



FEMA



Cal OES

GOVERNOR'S OFFICE
OF EMERGENCY SERVICES

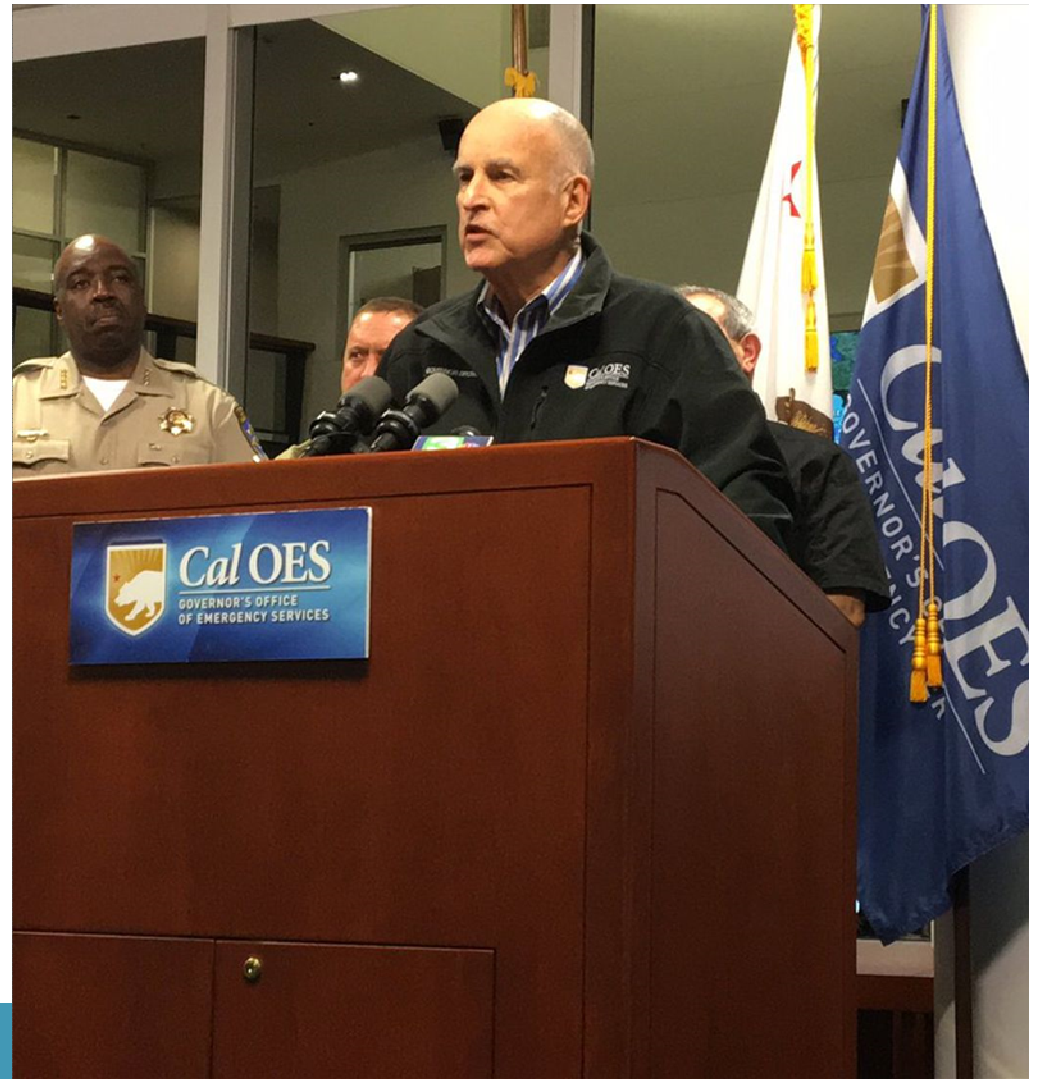


THE FEMA FACTOR

Monterey County is Eligible

Eligibility Criteria

- Direct result of declared disaster
- Located within the designated disaster area
- Must be the legal responsibility of the applicant



THE FEMA FACTOR

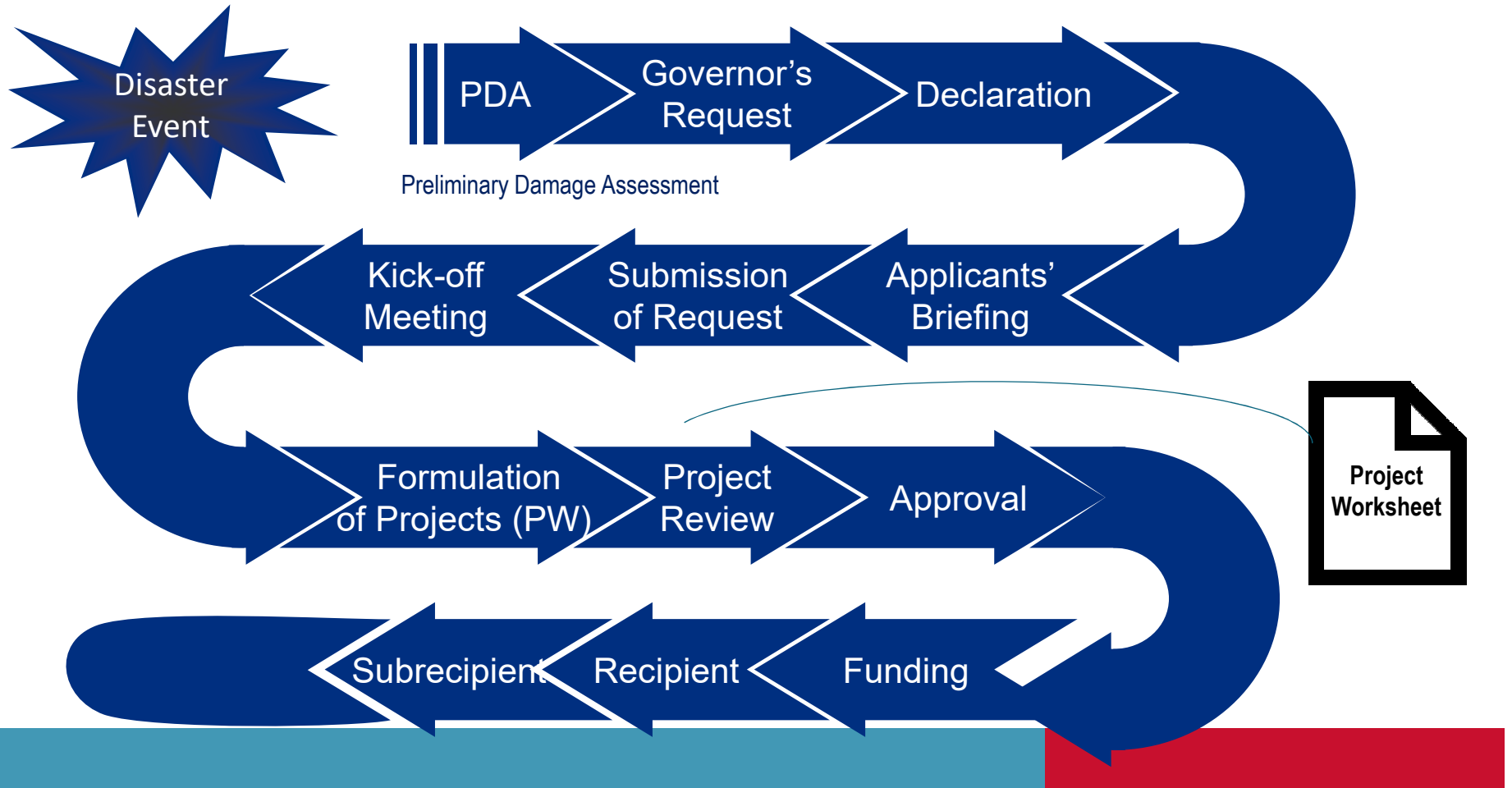
The Project is Eligible

Eligible Work (Categories A-G)

- Emergency Work
 - A. Debris removal
 - B. Emergency protective measures
- Permanent Work
 - C. Roads & Bridges
 - D. Water Control Facilities
 - E. Buildings & Equipment
 - F. Utilities
 - G. Parks & Recreation Facilities



THE PUBLIC ASSISTANCE PROCESS



THE FEMA FACTOR

Challenge #1 Replace or Improve?

Repair or Replacement Projects – FEMA pays

- Restore to pre-disaster design, function and capacity
- Possibly upgrade necessary to meet the requirements of reasonable codes and standards

Improved Projects – County pays

- Improve above/beyond pre-disaster condition

Agency	Reimbursement	Cost
FEMA	75%	\$3.75M
State	18.5%	\$925K
County	6.5%	\$325K

*Based on estimated construction cost of \$5M





Hurricane Harvey, Houston (August 2017)



Hurricane Maria, Puerto Rico
(September 2017)



Hurricane Irma and Jose,
Florida (September 2017)

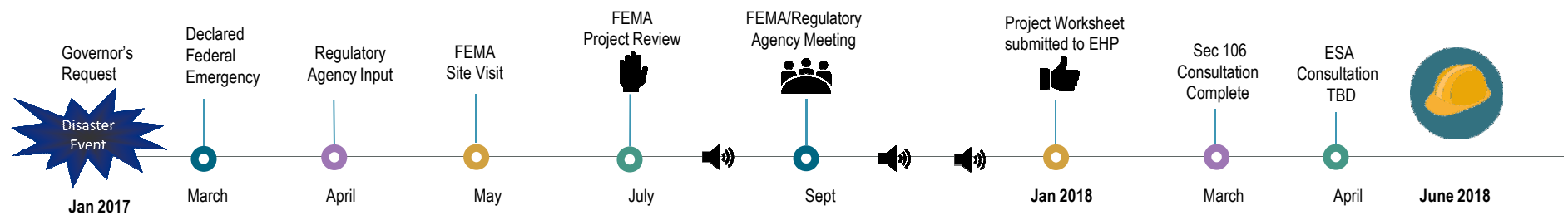


THE FEMA FACTOR

Challenge #2 other disasters

THE FEMA FACTOR

Challenges



*FEMA Staff Deployed to Other Disasters
(July-December 2017)*



LESSONS LEARNED

Design

- Involvement during emergency repairs
- Collaboration
 - Engineering
 - Environmental
 - Regulatory Agencies
 - FEMA
- Documentation

Environmental

- Early technical input involving all permitting agencies
- Engineering
 - USACE
 - RWQCB
 - CDFW
- Verify wetland delineation early
- Documentation

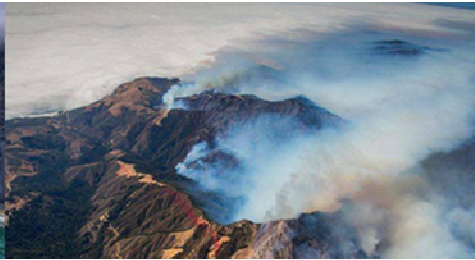
FEMA

- Understanding the process and what's allowed
- Regulatory agency involvement for "Codes & Standards" justification
- Documentation

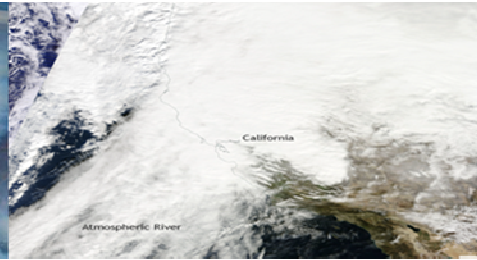
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Damage

THANK YOU
QUESTIONS/DISCUSSION